## REMARKS

Applicant appreciates the thorough examination of the present application as evidenced by the Official Action of March 2, 2006 (hereinafter "Office Action"). Applicant further appreciates the Examiner's indication that a claim amendment incorporating the recitations of Claim 1, (Claim 2 or 3 or 4), Claim 5, Claim 6, and Claim 7 "will provide a more favorable outcome". Office Action, Page 2. In response, Applicant has added new Claims 17-19, which depend from Claim 1. Claim 17 includes the recitations of Claims 2, 5, 6, and 7, Claim 18 includes the recitations of Claims 3, 5, 6, and 7, and Claim 19 includes the recitations of Claims 4, 5, 6, and 7. As such, no new matter has been added. Accordingly, Applicant respectfully submits that Claims 17-19 are patentable, and requests an indication of allowable subject matter therein. Independent Claims 1 and 9 have not been amended, however, as Applicant will show that these claims are patentable over the cited references for at least the reasons provided below.

### The Information Disclosure Statement

The Office Action states that Applicant's information disclosure statement filed December 20, 2004 failed to comply with the requirements of 37 C.F.R. 1.98(a)(3), because it did not include a concise explanation of the relevance of each patent that is not in the English language. In addition, the Office Action states that the Abstract for reference JP 2002-118414 was not considered because no translation was provided. *See* Office Action, Page 2.

However, as subsequently noted by the Examiner in his voicemail message of May 30, 2006, Applicant submits that an English language translation of both the JP 2002-118414 reference and the Abstract thereof have previously been provided. For the Examiner's convenience, Applicant submits herewith a copy of the Supplemental Information Disclosure Statement (IDS) of November 17, 2005. The Supplemental IDS includes: 1) an English language computer translation of Japanese Publication JP 2002-118414 (provided by the Japanese Patent Office website www.jpo.go.jp), along with 2) an English translation of the Abstract thereof, to thereby satisfy the requirements of 37 C.F.R. 1.98(a)(3). The attached copies of the Supplemental Information Disclosure Statement and the form PTO-1449 were printed from the U.S.

Patent Office Patent Application Information Retrieval (PAIR) System, and bear the U.S. Patent Office stamp indicating receipt on November 21, 2005.

Accordingly, consideration of these documents is respectfully requested.

## Independent Claim 1 Is Patentable Over the Cited References

Claims 1-16 stand rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent 6,456,249 to Johnson et al. (hereinafter "Johnson") in view of U.S. Patent 6,421,016 to Phillips et al. (hereinafter "Phillips"), European Patent Application EP 1030401 to Monma (hereinafter "Monma"), and U.S. Patent 6,337,667 to Ayala et al. (hereinafter "Ayala") or the publication "A Novel Technique to Increase the Realized Efficiency of a Mobile Phone Antenna Placed Beside a Head-Phantom" to Sager et al. (hereinafter "Sager"). However, Applicant respectfully submits that the combination of these references fails to disclose or suggest many of the recitations of the pending claims. Claim 1, for example, recites:

> 1. A mobile terminal comprising:
>
> a printed circuit board having first and second opposite sides and having a reference voltage conductor therein;
>
> an antenna coupled to the first side of the printed circuit board; and
>
> a parasitic resonator having first and second couplings to the second side of the printed circuit board wherein the printed circuit board and the first and second opposite sides thereof are between the antenna and the parasitic resonator,
>
> wherein the first coupling to the printed circuit board provides a first impedance between the parasitic resonator and the reference voltage conductor, and wherein the second coupling to the printed circuit board provides a second impedance between the resonator and the reference voltage conductor wherein the first and second impedances are different. (*Emphasis added*).

The Office Action asserts that Ayala and/or Sager discloses how the components of the mobile terminal can be arranged, but concedes that Johnson fails to disclose or suggest that "the second coupling to the printed circuit board provides a second impedance" and that "the first and second impedances are different". Office Action, Page 3. As such, the Office Action relies on Phillips and Monma to provide these recitations.

More particularly, the Office Action cites Figure 3 and Columns 4 and 6 of Phillips as disclosing multiple impedances Z1 and Z2, which can provide reactive tuning such that Z1 would not equal Z2. *See* Office Action, Page 3. As shown in Figure 3, Phillips is directed to an antenna system including a resonator **104** and an antenna **102** coupled to a printed circuit board **108**. Impedance elements **Z1** and **Z2** respectively couple the printed circuit board **108** and the resonator **104** to a battery **304**, and a balun **302** couples the resonator **104** to the printed circuit board **108**. *See* Phillips, Fig. 3. As further provided in Column 4 of Phillips:

> The second type of device to divert currents is a second conductor **108** that presents a high impedance to RF currents and is used to divert currents away from itself and any dissipating media located proximally thereto. This device is made to have a high electrical impedance at the frequencies of operation by one of several means used alone or in combination. These means include: the use of small conductors, i.e. thin wires or conductors that have a width that is much narrower than the first conductor so as to increase inductance; a length that is anti-resonant such as an open-ended structure having an electrical length that is substantially equal to an even number of quarter-wavelengths; and reactive tuning devices (**Z1** and/or **302** shown in **FIG. 3** and discussed below) coupled between the printed circuit board and radiotelephone circuits (such as a battery, for example) that increase the impedance of existing devices such as keypads, displays, earpieces, shielding or any other part of the phone in close proximity to the user when operating the device.

Phillips, Col. 4, lines 9-27 (*emphasis added*). In addition, Column 6 of Phillips provides:

> Because a battery **304** comprises a substantial conductor in a portable communication device, and because there can be insufficient room for a full-size quarter-wave counterpoise in many portable communication devices, the battery **304** can be used advantageously to load the counterpoise **104** to develop a proper overall resonance (low impedance path for currents from the antenna **102**). This is accomplished by implementing and controlling reactive tuning devices (impedances **Z1** and **Z2**), the components of which are implicit in the geometry of the phone as well as being separate components. The reactive device **Z2** is tuned to increase susceptance with the battery load, and the reactive device **Z1** is tuned to increase impedance with the battery load.

Phillips, Col. 6, lines 24-37 (*emphasis added*).

Accordingly, the cited portions of Phillips describe reactive tuning devices that may be coupled between the printed circuit board and radiotelephone circuits, such as a battery. In particular, the reactive tuning device **Z1** provides an impedance *between the printed circuit board 108 and the battery 304,* while the reactive tuning device **Z2** provides an impedance *between the resonator 104 and the battery 304. See* Phillips, Fig. 3. As such, Applicant submits that the impedances **Z1** and **Z2** of Phillips do not provide "a first impedance between the parasitic resonator and the reference voltage conductor" of a printed circuit board, and "a second impedance between the resonator and the reference voltage conductor", as recited by Claim 1. In addition, nowhere do the cited portions of Phillips disclose or suggest that the impedances **Z1** and **Z2** "are different", as recited by Claim 1. Moreover, although Figure 3 of Phillips illustrates an impedance device/balun **302** coupled between the resonator **104** and the printed circuit board **108**, the balun **302** is a single impedance element, and as such, also does not disclose or suggest "a second impedance between the resonator and the reference voltage conductor wherein the first and second impedances are different". Thus, Applicant respectfully submits that the cited portions of Phillips fail to disclose or suggest at least the above recitations of Claim 1.

The Office Action further cites Paragraph 0007 and Figures 1-3 of Monma as disclosing "connection(s) to impedances which overcomes obstacle problems caused by a user's head proximate the mobile device". Office Action, Page 3. However, as provided in the cited paragraph of Monma:

> An object of the present invention is to solve the above-mentioned problems and to provide a radio antenna apparatus, in which the horizontal plane directivity pattern of the antenna is changed in a direction not affected by an obstacle, and a radio wave interference by the obstacle is reduced so as to improve a radiation efficiency thereof.

Monma, Paragraph 0007. Applicant submits that nowhere does this portion of Monma disclose or suggest impedances between a parasitic resonator and a reference voltage conductor in a printed circuit board. Nor do the cited Figures provide such recitations. For example, Figures 1 and 2 of Monma illustrate impedance elements **104** and **205** respectively coupled to a passive element **103** and a planar antenna **203**; however, the Figures do not disclose or suggest that the element **103** and/or the antenna **203** is a "parasitic resonator" as recited by Claim 1. *See* Monma, Figs. 1-2.

In addition, even if the element **103** was considered as a parasitic resonator, Figure 1 illustrates only a first impedance **104** coupled to the element **103**, and does not illustrate a second coupling thereto. *See* Monma, Fig. 1. Likewise, even if the antenna **203** was considered as a parasitic resonator including a first coupling (impedance element **205**) and a second coupling (short circuiting line **203a**), the short circuiting line **203a** appears to couple the antenna **203** to the housing **210**, not to a printed circuit board. *See* Monma, Fig. 2. Moreover, the cited Figures of Monma do not even explicitly illustrate a printed circuit board. *See* Monma, Figs. 1-3.

Thus, Applicants submit that Monma also fails to disclose or suggest first and second couplings to a printed circuit board "wherein the second coupling to the printed circuit board provides a second impedance between the resonator and the reference voltage conductor", and "wherein the first and second impedances are different", as recited by Claim 1. Nor does the Office Action rely on Sager and/or Ayala as disclosing these recitations. Accordingly, as none of the cited references disclose or suggest the above recitations, Applicants submit that the combination of the cited references fails to disclose or suggest all of the recitations of Claim 1.

Moreover, Applicant submits that it would not be obvious to combine the teachings of Johnson with those of Sager, Ayala, Phillips and/or Monma. The Office Action states that it would have been obvious to modify Johnson based on the cited references "to provide means for diverting currents away from the user's head when operating the device...as is commercially available and provides better performance". Office Action, Page 4.

However, Applicant submits that, "[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." MPEP, Section 2143. In addition, to support combining references, evidence of a suggestion, teaching, or motivation to combine must be clear and particular, and this requirement for clear and particular evidence is not met by broad and conclusory statements about the teachings of references. *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999). It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 312-13 (Fed. Cir. 1983). Furthermore, as provided in the MPEP, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)." MPEP, Sec. 2143.

Accordingly, Applicant respectfully submits that there is no suggestion or motivation to modify Johnson, especially in light of the differences between the disclosure of Johnson and the teachings of the other cited references. For example, as noted by the Office Action, Phillips and Monma disclose an antenna located *away* from a parasitic element, and Sager and Ayala further disclose an antenna and a resonator on *opposite* sides of a PCB. *See* Office Action, Pages 3-4. However, in Figures 1-19, Johnson illustrates *twelve* different embodiments of an antenna assembly, each of which includes a parasitic resonator element **18** and a driven conductor element **16** on the *same* side of a printed circuit board **22**. *See* Johnson, Figs. 1-19. As *none* of the twelve embodiments of Johnson appears to contemplate locating the driven conductor **16** and the parasitic resonator **18** on opposite sides of the printed circuit board **22**, Applicant submits that there is no suggestion to modify Johnson to provide such an antenna/resonator arrangement based on the teachings of Sager, Ayala, Phillips and/or Monma, and moreover, that Johnson teaches away from such a combination.

In addition, Applicant submits that simply stating the desired result of "diverting currents away from the user's head" does not provide "clear and particular" evidence as to *how* modification of the disclosure of Johnson would provide such a result. Moreover, the Office Action provides no basis that such a modification would have "a reasonable expectation of success", in light of the different antenna types and configurations disclosed in the cited references. In other words, Applicant submits that it would not be obvious to selectively combine elements of Johnson having planar antenna elements on a same side of a printed circuit board with elements of Phillips having a helical antenna with elements of Monma having a whip antenna with elements of Ayala having a single feed antenna with elements of Sager having a planar elements on opposite sides of a printed circuit board to somehow teach or suggest the mobile terminal of Claim 1. Accordingly, if the Examiner wishes to maintain the rejection of Claim 1 based on these references, Applicant respectfully requests that the Examiner point out motivation for the combination in the prior art and a basis for a reasonable expectation of success, as required by MPEP Section 2143.

In view of the above, Applicant submits that the combination of the cited references to Johnson, Phillips, Monma, Sager, and Ayala fails to disclose or suggest all of the recitations of Claim 1, and that it would not be obvious to combine these references. For at least these reasons, Applicant submits that Claim 1 is patentable over the cited references. Also, Claims 2-8 are patentable at least per the patentability of Claim 1 from which they depend.

## Independent Claim 9 Is Patentable Over the Cited References

In addition, independent Claim 9 recites:

> 9. A mobile terminal comprising:
>
> a printed circuit board having first and second opposite sides and having a reference voltage conductor therein;
>
> an antenna coupled to the first side of the printed circuit board; and
>
> a parasitic resonator having first and second couplings to the second side of the printed circuit board wherein the printed circuit board and the first and second opposite sides thereof are between the antenna and the parasitic resonator,
>
> wherein at least one of the first and second couplings to the printed circuit board comprises a discrete impedance element between the parasitic resonator and the reference voltage conductor. (*Emphasis added*).

Applicant notes that, in rejecting Claim 9, the Office Action fails to point to any of the cited references as disclosing or suggesting the recitations of Claim 9 highlighted above. *See* Office Action, Pages 2-4. However, Applicant notes that the Office Action relies on Phillips and Monma as disclosing similar recitations in its rejection of Claims 5-7 and 10-11, and as such, will address the rejection of Claim 9 responsive to these rejections. *See* Office Action, Pages 5-6.

More particularly, with reference to Claims 5-7 and 10-11, the Office Action asserts that Phillips teaches discrete tunable components Z1 and Z2 which are attached/soldered to a printed circuit board. *See* Office Action, Page 5. However, as discussed above with reference to Claim 1, the reactive tuning device **Z1** provides an impedance ***between the printed circuit board 108 and the battery 304,*** while the reactive tuning device **Z2** provides an impedance ***between the resonator 104 and the battery 304.*** *See* Phillips, Fig. 3. As such, neither of the impedances **Z1** or **Z2** of Phillips discloses or suggests a "discrete impedance element between the parasitic resonator and the reference voltage conductor", as recited by Claim 9.

The Office Action further asserts that Monma teaches an impedance matching circuit **221** and various designs for connecting inductors and capacitors in Figures 8-13. *See* Office action, Page 5. However, the impedance matching circuit **221** illustrated in Figure 2 appears to be connected between the plane antenna **203** and the transceiver unit **208**, while the inductor capacitor circuits illustrated in Figures 10-13 appear to be connected between a transceiver unit **106** and an antenna **102**. *See* Monma, Figs. 2 and 10-13. Thus, the cited portions of Monma also do not appear to disclose or suggest a "discrete impedance element between the parasitic resonator and the reference voltage conductor", as recited by Claim 9.

The Office Action also asserts that it would be obvious to modify Johnson based on Phillips and/or Monma to include discrete impedance elements "to provide inductive/capacitive impedances which minimize the magnetic field on the front conductor surface". Office Action, Page 6. However, as discussed above with reference to Claim 1, Phillips, Monma, and Johnson all disclose different types of antennas, as well as different antenna/resonator configurations. As such, even though Z1 and Z2 may be used to minimize the magnetic field on the front conductor surface in the antenna assembly of Phillips, the use of such impedance elements in the antenna/resonator configuration of Johnson may not necessarily provide the same result. Thus, Applicant submits that the Office Action provides no basis for a reasonable expectation of success of such a modification. Accordingly, Applicant submits that it would not be obvious to modify Johnson based on Phillips and/or Monma. In addition, as discussed above, Johnson illustrates twelve antenna assemblies including the antenna and the resonator on opposite sides of a printed circuit board, and as such, teaches away from modification based on Phillips and/or Monma.

Thus, Applicant submits that the combination of the cited references do not disclose or suggest all of the recitations of Claim 9, and that it would not be obvious to combine the cited references. Accordingly, Claim 9 is patentable over the combination of the cited references for at least the above reasons. In addition, Claims 10-16 are patentable at least per the patentability of 9 from which they depend.

## Many of the Dependent Claims Are Separately Patentable

As discussed above, Applicant submits that each of the dependent claims are patentable over the cited references at least per the patentability of independent Claims 1 and 9 from which they respectively depend. In addition, many of the dependent claims are independently patentable. For example, Claim 7 recites that one of the first and second couplings between the parasitic resonator and the printed circuit board is a discrete impedance element "soldered on the printed circuit board".

The Office Action asserts that Phillips teaches discrete tunable components Z1 and Z2 which are attached/soldered to a printed circuit board in Figure 3, and asserts that Monma teaches various designs for connecting inductors and capacitors in Figures 8-13. *See* Office Action, Page 5. However, Applicant submits that, although Phillips may describe reactive tuning devices Z1 and Z2, nowhere do the cited portions of Phillips appear to disclose or suggest that these devices are soldered to the printed circuit board **108**. *See* Phillips, Fig. 3. Nor do the cited portions of Monma appear to disclose or suggest that the inductors and/or capacitors are soldered to a printed circuit board. *See* Monma, Figs. 8-13.

Accordingly, Applicant submits that the combination of the cited references fails to disclose or suggest that at least one of the first and second couplings between the parasitic resonator and the printed circuit board is a discrete impedance element "soldered on the printed circuit board", as recited by Claim 7. As such, Applicant submits that Claim 7 is separately patentable over the combination of the cited references. Claim 11 similarly recites discrete impedance elements soldered on the printed circuit board, and is therefore patentable for at least similar reasons. In addition, new Claims 17-19 include similar recitations, and are thus also patentable for at least similar reasons.

## Conclusion

For at least the reasons discussed above, Applicant submits that Claims 1-19 are patentable over the cited references, and that the claims are, therefore, in condition for allowance. Applicant encourages the Examiner to contact the undersigned by telephone to resolve any remaining issues.

Respectfully submitted,

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